



# **POLLUTION PREVENTION PROGRAM USAG SCHINNEN, THE NETHERLANDS**

## **POLLUTION PREVENTION MANAGEMENT PLAN DRAFT**

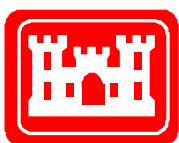
---

Contract No.: DACA90-00-D-0038

Delivery Order 0060

AMEC Project No.: 0-742-30060G

**Prepared for:**



**U.S. Army Corps of Engineers  
Europe District  
Konrad-Adenauer-Ring 39  
D-65187 Wiesbaden**

**Prepared by:**



**AMEC Earth & Environmental GmbH  
Eschborner Landstrasse 42-50  
D-60489 Frankfurt/Main**

**May 2005**

## TABLE OF CONTENTS

|  |            |
|--|------------|
| <b>SUMMARY OF POLLUTION PREVENTION GOALS.....</b>                    | <b>vi</b>  |
| <b>PROJECT SUMMARY TABLE .....</b>                                   | <b>vii</b> |
| <b>CHAPTER 1 INTRODUCTION .....</b>                                  | <b>1</b>   |
| 1.1 STATEMENT OF PURPOSE.....  | 1          |
| 1.2 BACKGROUND AND MISSION .....                                     | 1          |
| 1.3 DEFINITION OF POLLUTION PREVENTION .....                         | 3          |
| 1.4 BENEFITS OF POLLUTION PREVENTION .....                           | 3          |
| <b>CHAPTER 2 POLLUTION PREVENTION REGULATORY BACKGROUND .....</b>    | <b>5</b>   |
| 2.1 FEDERAL LEGISLATION .....  | 5          |
| 2.2 PRESIDENTIAL EXECUTIVE ORDERS .....                              | 6          |
| 2.3 DEPARTMENT OF DEFENSE (DoD) DIRECTIVES AND INSTRUCTIONS.....     | 7          |
| 2.4 U.S. ARMY REGULATIONS AND GUIDANCE .....                         | 8          |
| 2.5 FINAL GOVERNING STANDARDS (FGS) FOR THE NETHERLANDS .....        | 8          |
| 2.6 DUTCH POLLUTION PREVENTION LEGISLATION.....                      | 9          |
| <b>CHAPTER 3 INSTALLATION POLLUTION PREVENTION PROGRAM .....</b>     | <b>10</b>  |
| 3.1 POLICY .....   | 10         |
| 3.2 POLLUTION PREVENTION MANAGEMENT STRUCTURE .....                  | 10         |
| 3.3 BASELINE DEVELOPMENT .....                                       | 11         |
| 3.4 OPPORTUNITY ASSESSMENTS .....                                    | 12         |
| 3.5 POLLUTION PREVENTION GOALS .....                                 | 12         |
| 3.6 IMPLEMENTATION AND EVALUATION .....                              | 12         |
| 3.7 REPORTING REQUIREMENTS .....                                     | 13         |
| 3.8 POLLUTION PREVENTION PROJECT FUNDING .....                       | 14         |
| 3.9 POLLUTION PREVENTION AWARENESS TRAINING PROGRAM .....            | 14         |
| <b>CHAPTER 4 COMPLIANCE THROUGH POLLUTION PREVENTION .....</b>       | <b>16</b>  |
| 4.1 DESCRIPTION OF COMPLIANCE THROUGH P2.....                        | 16         |
| 4.2 COMPLIANCE SITES.....  | 16         |
| 4.3 COMPLIANCE THRESHOLDS .....                                      | 18         |
| <b>CHAPTER 5 HAZARDOUS MATERIALS AND WASTE .....</b>                 | <b>19</b>  |
| 5.1 PREVENTION GOAL .....  | 19         |
| 5.2 BASELINE AND PROGRESS .....                                      | 19         |
| 5.3 DESCRIPTION OF MAJOR HAZARDOUS WASTE GENERATING ACTIVITIES ..... | 19         |
| 5.4 PAST COMPLETED POLLUTION PREVENTION INITIATIVES .....            | 20         |
| 5.5 CURRENT POLLUTION PREVENTION INITIATIVES .....                   | 22         |
| 5.6 POTENTIAL POLLUTION PREVENTION INITIATIVES .....                 | 25         |
| <b>CHAPTER 6 NON-HAZARDOUS SOLID WASTE .....</b>                     | <b>30</b>  |
| 6.1 GOAL.....  | 30         |
| 6.2 BASELINE AND PROGRESS.....                                       | 30         |
| 6.3 DESCRIPTION OF MAJOR SOLID WASTE STREAMS.....                    | 30         |
| 6.4 PAST COMPLETED POLLUTION PREVENTION INITIATIVES .....            | 31         |
| 6.5 POTENTIAL POLLUTION PREVENTION INITIATIVES .....                 | 31         |
| <b>CHAPTER 7 WATER AND WASTEWATER .....</b>                          | <b>34</b>  |
| 7.1 GOAL.....  | 34         |
| 7.2 BASELINE AND PROGRESS.....                                       | 34         |
| 7.3 CURRENT POLLUTION PREVENTION INITIATIVES .....                   | 34         |
| 7.4 POTENTIAL POLLUTION PREVENTION INITIATIVES .....                 | 35         |
| <b>CHAPTER 8 ENERGY CONSERVATION .....</b>                           | <b>37</b>  |

|  |  |           |
|--|--|-----------|
| 8.1  | GOAL.....  | 37        |
| 8.2  | BASELINE AND PROGRESS.....                       | 37        |
| 8.3  | CURRENT POLLUTION PREVENTION INITIATIVES .....   | 37        |
| 8.4  | POTENTIAL POLLUTION PREVENTION INITIATIVES ..... | 37        |
| <b>CHAPTER 9 AFFIRMATIVE PROCUREMENT .....</b> |  | <b>41</b> |
| 9.1  | GOALS.....                                       | 41        |
| 9.2  | CURRENT POLLUTION PREVENTION INITIATIVES .....   | 41        |
| 9.3  | POTENTIAL POLLUTION PREVENTION INITIATIVES ..... | 41        |

## INDEX OF FIGURES

|   |   |
|---|---|
| Figure 1: Site Plan of USAG Schinnen HQ Installation..... | 2 |
|---|---|

## INDEX OF TABLES

|  |      |
|--|------|
| Table 1: Summary of Pollution Prevention Goals .....                                   | vi   |
| Table 2: Project Summary Table of Completed P2 Projects.....                           | vii  |
| Table 3: Project Summary Table of Proposed P2 Projects.....                            | viii |
| Table 4: Installation/Facilities Supported by the USAG Schinnen .....                  | 3    |
| Table 5: Pollution Prevention Awareness Training Program: P2 Awareness Training Form   | 15   |
| Table 6: Quantity of Hazardous Material/Waste Storage Areas and Accumulation Points... | 17   |
| Table 7: Baseline and Progress of Total Hazardous Waste Disposed .....                 | 19   |
| Table 8: Payback Calculation for Consolidating Hazmat Storage at HQ Installation.....  | 23   |
| Table 9: Payback Calculation for Consolidating Hazmat Storage at CDC Brunssum.....     | 24   |
| Table 10: Payback Calculation for Fire Extinguishers .....                             | 28   |
| Table 11: Baseline and Progress of Total Non-Hazardous Solid Waste Disposed.....       | 30   |
| Table 12: Payback Calculation for Scrap Metal Recycling .....                          | 32   |
| Table 13: Payback Calculation for Roof Construction .....                              | 33   |
| Table 14: Baseline and Progress of Water Consumption .....                             | 34   |
| Table 15: Baseline and Progress of Energy Consumption .....                            | 37   |

## LIST OF ACRONYMS AND ABBREVIATIONS

|         |   |
|---------|---|
| AAFES   | Army/Air Force Exchange Service                                       |
| ACS     | Army Community Services   |
| AFH     | Army Family Housing   |
| ALARA   | As Low As Reasonably Achievable                                       |
| AMC     | Army Material Command   |
| AMEC    | AMEC Earth & Environmental GmbH                                       |
| AP      | Affirmative Procurement   |
| AR      | Army Regulation   |
| B&G     | Buildings and Grounds   |
| BATNEEC | Best Available Techniques Not Entailing Excessive Costs               |
| CDC     | Child Development Center  |
| CERCLA  | Comprehensive Environmental Response, Compensation, and Liability Act |
| CPO     | Civilian Personnel Office   |
| CY      | Calendar Year   |
| DCA     | Directorate of Community Activities                                   |
| DECA    | Defense Commissary Agency   |
| DoD     | Department of Defense   |
| DOL     | Department of Logistics   |
| DRMO    | Defense Reutilization and Marketing Office                            |
| DPW     | Directorate of Public Works   |
| €       | Euros   |
| EMO     | Environmental Management Office                                       |
| EO      | Executive Order   |
| EPA     | Environmental Protection Agency                                       |
| EPAS    | Environmental Performance Assessment System                           |
| EPAR    | Environmental Performance Assessment Report                           |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                    |
| EPR     | Environmental Program Requirement                                     |
| EQ      | Environmental Quality   |
| EQCC    | Environmental Quality Control Committee                               |
| EQR     | Environmental Quality Report  |
| F&ES    | Fire & Emergency Services   |
| FGS     | Final Governing Standards   |
| FY      | Fiscal Year   |
| GLQ     | Government Leased Quarters  |

|                 |   |
|-----------------|---|
| GRHP            | Government Rental Housing Program           |
| HM              | Hazardous Material                          |
| HMCC            | Hazardous Material Control Center           |
| HMSA            | Hazardous Material Storage Area             |
| HSG             | Housing                                     |
| HSWA            | Hazardous and Solid Waste Amendments        |
| HW              | Hazardous Waste                             |
| HWAP            | Hazardous Waste Accumulation Point          |
| HWSA            | Hazardous Waste Storage Area                |
| HQ              | Headquarters                                |
| HQDA            | Headquarters Department of the Army         |
| ICAP            | Installation Corrective Action Plan         |
| IPPC            | Integrated Pollution Prevention and Control |
| IPR             | In Progress Report                          |
| kg              | Kilogram                                    |
| km <sup>2</sup> | Square Kilometers                           |
| kWh             | Kilowatt-hour                               |
| L               | Liter                                       |
| m               | Meter                                       |
| MACOM           | Major Army Command                          |
| mpg             | Mile Per Gallon                             |
| MoM             | Measures of Merit                           |
| MPC             | Medium Port Command                         |
| MWR             | Moral, Welfare and Recreation               |
| NEPA            | National Environmental Policy Act           |
| O&M             | Operations & Maintenance                    |
| ODS             | Ozone Depleting Substances                  |
| P2              | Pollution Prevention                        |
| P2OA            | Pollution Prevention Opportunity Assessment |
| P2MP            | Pollution Prevention Management Plan        |
| POC             | Point of Contact                            |
| POL             | Petroleum, Oil and Lubricants               |
| RCRA            | Resource Conservation and Recovery Act      |
| SORT            | Separate or Recycle Trash                   |
| SSA             | Surface Supply Agency                       |
| SSO             | Service Supply Organization                 |
| SW              | Solid Waste                                 |

|         |  |
|---------|--|
| SWAR    | Solid Waste Annual Report                    |
| TRI     | Toxic Release Inventory                      |
| TSC     | Tri-boarder Community Service Center         |
| USAG    | U.S. Army Garrison                           |
| USAREUR | U.S. Army, Europe                            |
| UST     | Underground Storage Tanks                    |
| VEPP    | Validated Environmental Pollution Prevention |

Abbreviations for installation and military unit names not included.

## SUMMARY OF POLLUTION PREVENTION GOALS

Regulatory guidance and requirements for Pollution Prevention (P2) practices at the US Army Garrison (USAG) Schinnen stem from environmental legislation enacted in both the United States and the Netherlands. Guidance on P2 practices at Army Installations is available within several documents. Detailed information on Army P2 guidance and requirements is included in Chapter 2 of this Pollution Prevention Management Plan (P2MP).

P2 goals have been developed based on the current guidance and regulations. The following table illustrates the P2 goals that guide activities at the USAG Schinnen and provide a framework for the P2 program.

**Table 1: Summary of Pollution Prevention Goals**

| Media                   | Goal  | Source of Goal   | Baseline Year | Target Year |
|-------------------------|---|------------------|---------------|-------------|
| Hazardous Waste         | Continuous annual reduction in disposal   | Proposed DoD MoM | CY 2004       | NA          |
| Solid Waste             | Continuous reduction in solid waste generation per capita<br>Continuous increase in the portion of solid waste diverted | DoD MoM          | FY 2004       | NA          |
| Air Emissions           | Continuous annual reduction in emissions  | DoD MoM          | FY 2004       | NA          |
| Wastewater Generation   | Continuous annual reduction in wastewater generation  | ---              | FY 2004       | NA          |
| Energy                  | Reduction in facility energy consumption by 30%   | EO 13123         | 1985          | 2005        |
|                         | Reduction in facility energy consumption by 35%   | EO 13123         | 1985          | 2010        |
| Affirmative Procurement | Training of procurement officers and integration of AP into developing plans, work statements, and specifications       | EO 13148         | NA            | NA          |

## PROJECT SUMMARY TABLE

Table 2 below lists already implemented and completed P2 projects at the USAG Schinnen. Table 3 lists the P2 initiatives that are in progress and potential P2 initiatives for the future that were identified in the P2 Opportunity Assessment (P2OA) of March 2005 or that were not implemented from the P2MP of 1999.

**Table 2: Project Summary Table of Completed P2 Projects<sup>1</sup>**

| Project Name  | Targeted Pollution Source                              | Implementation Status and Date | Funding Source | Compliance Thru P2? | P2 Plan Section |
|---|--|--------------------------------|----------------|---------------------|-----------------|
| <b>Hazardous Materials and Waste</b>                    |  |                                |                |                     |                 |
| Centralized Hazardous Material Control Center           | Hazardous materials                                    | Fully implemented (2002)       | VEPP           | N/A                 | 5.4.1           |
| Aerosol can puncturing unit                             | Aerosol cans with hazardous residues (hazardous waste) | Fully implemented (2000)       | VEPP           | N/A                 | 5.4.2           |
| Reduction of oil contaminated waste via absorbent reuse | Oil contaminated absorbent (hazardous waste)           | Fully implemented (2000)       | VEPP           | N/A                 | 5.4.3           |
| Reduction of oil contaminated waste via drip pans       | Oil contaminated materials (hazardous waste)           | Fully implemented (2000)       | VEPP           | N/A                 | 5.4.3           |
| <b>Non-Hazardous Solid Waste</b>                        |  |                                |                |                     |                 |
| Office paper recycling                                  | Solid waste  | Fully implemented (2000)       | VEPP           | N/A                 | 6.4.1           |

<sup>1</sup> Data based on P2 projects proposed in the P2MP of June 1999.



**Table 3: Project Summary Table of Proposed P2 Projects**

| Project Name  | Targeted Pollution Source                | Implementation Status and Date             | Funding Source | Compliance Thru P2? | P2 Plan Section |
|---|--|--|----------------|---------------------|-----------------|
| <b>Hazardous Materials and Waste</b>  |  |  |                |                     |                 |
| Consolidate hazardous materials storage activities to HMCC                          | Hazardous materials                      | In progress                                |                | Yes <sup>2</sup>    | 5.5.1           |
| Reduce hazardous materials storage areas at CDC Brunssum                            | Hazardous materials                      | In progress                                |                | Yes                 | 5.5.2           |
| Reduction of oil contaminated waste via an oil suction system                       | Oil contaminated waste (hazardous waste) | Delayed indefinitely (from P2MP June 1999) | VEPP           | N/A                 | 5.6.1           |
| Acid battery life extension   | Acid batteries (hazardous materials)     | Delayed indefinitely (from P2MP June 1999) | VEPP           | N/A                 | 5.6.2           |
| Hazardous material tracking system  | Hazardous materials                      | Requires further investigation             |                | N/A                 | 5.6.3           |
| Control cleaning agents internally  | Hazardous materials                      | Requires further investigation             |                | N/A                 | 5.6.4           |
| Control pesticides internally   | Hazardous materials                      | Requires further investigation             |                | N/A                 | 5.6.5           |
| Reduce disposal costs of dry chemical extinguishers                                 | Fire extinguishers (hazardous waste)     | Pursuing funding                           |                | N/A                 | 5.6.6           |
| Substitute small oil containers with larger containers equipped with POL dispensers | Oil contaminated waste (hazardous waste) | Requires further investigation             |                | N/A                 | 5.6.7           |
| <b>Non-Hazardous Solid Waste</b>  |  |  |                |                     |                 |
| Scrap metal recycling   | Scrap metal                              | Pursuing funding                           |                | N/A                 | 6.5.1           |
| Construct roof for sand/soil storage area   | Mud trap waste                           | Pursuing funding                           |                | N/A                 | 6.5.2           |
| Wood crushing machine   | Wood waste                               | Requires further Investigation             |                | N/A                 | 6.5.3           |
| <b>Water and Wastewater</b>   |  |  |                |                     |                 |
| Water management measures   | Water consumption                        | In progress                                |                | N/A                 | 7.3.1           |
| Awareness program   | Water consumption                        | In progress                                |                | N/A                 | 7.3.2           |
| Metering System   | Water consumption                        | Requires further investigation             |                | N/A                 | 7.4.1           |
| Economic incentives   | Water consumption                        | Requires further investigation             |                | N/A                 | 7.4.2           |

<sup>2</sup> Yes indicates that by implementing this P2 initiative the USAG Schinnen will reduce its compliance burden.

| Project Name   | Targeted Pollution Source | Implementation Status and Date          | Funding Source | Compliance Thru P2? | P2 Plan Section |
|--|---------------------------|---|----------------|---------------------|-----------------|
| Water efficient equipment                              | Water consumption         | On-going initiative on an as-need basis |                | N/A                 | 7.4.3           |
| <b>Energy Conservation</b>                             |                           |   |                |                     |                 |
| Awareness program                                      | Energy use                | In progress                             |                | N/A                 | 8.3.1           |
| Insulation of exposed heating pipes                    | Energy use                | Requires further investigation          |                | N/A                 | 8.4.1           |
| Metering system  | Energy use                | Requires further investigation          |                | N/A                 | 8.4.2           |
| Economic incentives                                    | Energy use                | Requires further investigation          |                | N/A                 | 8.4.3           |
| Installation of photovoltaic cells                     | Energy use                | Requires further investigation          |                | N/A                 | 8.4.4           |
| Consolidate printer use and minimize personal printers | Energy use                | Requires further investigation          |                | N/A                 | 8.4.5           |
| Energy efficient equipment                             | Energy use                | On-going initiative on an as-need basis |                | N/A                 | 8.4.6           |
| <b>Affirmative Procurement</b>                         |                           |   |                |                     |                 |
| Awareness program                                      | Conservation              | In progress                             |                | N/A                 | 9.2.1           |
| Energy efficient equipment                             | Conservation              | On-going initiative on an as-need basis |                |                     | 9.2.2           |
| Electric vehicles                                      | Conservation              | Requires further investigation          |                | N/A                 | 9.2.3           |

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 STATEMENT OF PURPOSE**

This Plan establishes US Army Garrison (USAG) Schinnen's commitment to environmental leadership in pollution prevention (P2) by outlining the concepts and practices necessary to reduce the use of hazardous materials and the release of pollutants. This Plan is also meant to be used as a tool for the installation to document, track, and manage its pollution prevention efforts in pursuit of achieving pollution prevention goals.

This Pollution Prevention Management Plan (P2MP) is prepared in accordance with requirements of the applicable components of Headquarters Department of the Army (HQDA) Pollution Prevention Plan Guidance (June 2001). This Plan will serve as a single reference document to manage the actions and programs needed to develop and execute the USAG's pollution prevention program. The integrated P2MP will document current and planned future USAG pollution prevention actions, addressing the following program elements, resources uses and waste streams:

- Hazardous materials and hazardous waste;
- Solid waste;
- Potable water use;
- Energy use; and
- Affirmative Procurement.

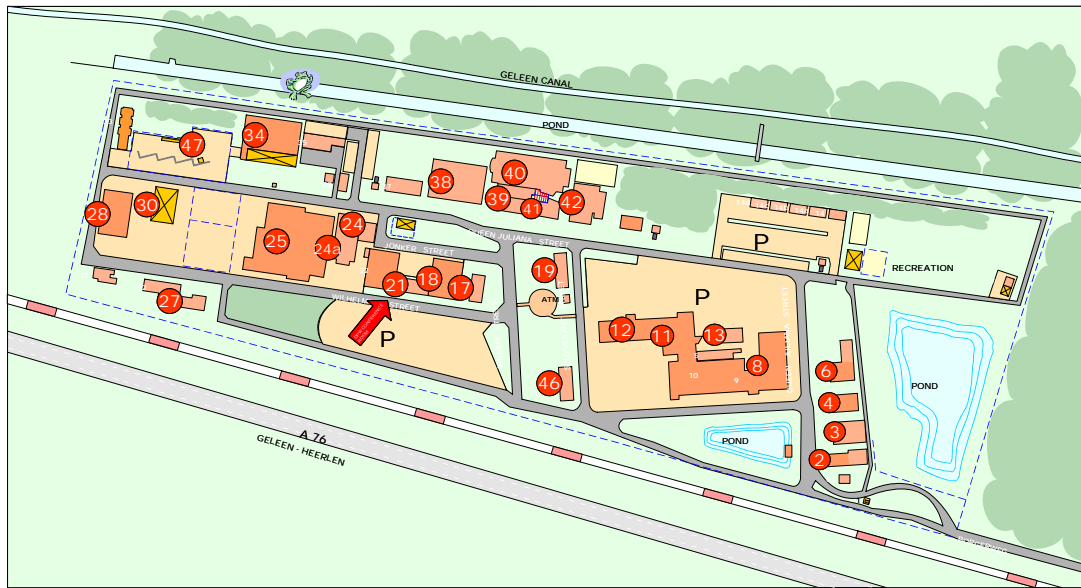
The P2 actions identified in this P2MP are based on the results of the P2 Opportunity Assessment (P2OA) and information readily available during the site visit for the P2 Baseline Inventory data collection and provided by USAG Schinnen personnel on 19 and 20 October 2004 and 4 February 2005.

During the most current P2OA, no P2 opportunities for the reduction of air emissions were identified.

### **1.2 BACKGROUND AND MISSION**

USAG Schinnen is located at the former Emma Mine in Schinnen, the Netherlands. USAG Schinnen is located west of the town of Schinnen on Borgerweg number 10, in the province of Limburg. The site is bounded to the north by the Geleen Canal and bounded to the south by the railroad and highway which runs between the towns of Geleen and Nuth. Figure 1 below shows a site plan of the USAG Schinnen HQ Installation.

**Figure 1: Site Plan of USAG Schinnen HQ Installation**



**LEGEND:**

|                                    |                                 |                                  |
|------------------------------------|---------------------------------|----------------------------------|
| Bldg 2 Military Police / Info Desk | Bldg 13 AAFES Bookmark          | Bldg 30 AAFES Gas Station        |
| Bldg 3 Community Classroom         | Bldg 17 CPO                     | Bldg 31 Haz. Mat. Control Center |
| Bldg 4 Travel Office               | Bldg 18 Supply Shop             | Bldg 33 Haz. Waste Storage       |
| Bldg 6 DOL                         | Bldg 19 Banking                 | Bldg 34 AAFES Toy Land / PXTRA   |
| Bldg 6 Transportation              | Bldg 21 DPW                     | Bldg 38 Sports Center            |
| Bldg 8 HQ 254th BSB                | Bldg 24 Self Help Store         | Bldg 39 ACS                      |
| Public Affairs Office              | Bldg 24a Postal Services        | Bldg 40 Bowling Center           |
| Bldg 11 AAFES Main Exchange        | Bldg 25 Commissary              | Bldg 41 Memory Lane (Club)       |
| Bldg 12 AAFES Burger King          | Bldg 27 Vehicle Processing Ctr. | Bldg 42 Fitness Center           |
| AAFES Shoppette                    | Bldg 28 AAFES Car Care Center   | Bldg 46 DCA                      |
| Thrift Shop                        |                                 | Bldg 47 Sort Center              |

USAG Schinnen provides logistical support to over more than 140,000 square kilometers (km<sup>2</sup>) for 105 customer activities spread across the Netherlands and Germany. Table 4 below shows the different installations/facilities that are supported by USAG Schinnen.

**Table 4: Installation/Facilities Supported by the USAG Schinnen**

| Province / Country         | Installations supported   |
|----------------------------|---|
| Limburg / Netherlands      | <ul style="list-style-type: none"><li>• USAG Schinnen HQ Installation</li><li>• SSA/HQ Eygelshoven</li><li>• TSC Treebeek</li><li>• SSO Schinnen</li><li>• AFNORTH U.S. Facilities</li><li>• SSQ Hoensbroek</li><li>• Leased Quarters Limburg</li><li>• DoD School Volkel</li><li>• Leased Quarters Brabant</li><li>• Rotterdam Admin Facility</li><li>• Capelle Leased Housing Facility</li><li>• Housing Area Rheindahlen</li><li>• MPC Bremerhafen</li></ul> |
| Brabant / Netherlands      |   |
| Zuid Holland / Netherlands |   |
| Germany                    |   |

The P2 actions described in the P2MP report apply specifically to the USAG Schinnen Headquarters (HQ) Installation, but may also be applied and adopted by other supported installations or facilities, where applicable.

### **1.3 DEFINITION OF POLLUTION PREVENTION**

P2 encompasses those activities which reduce the quantity of hazardous, toxic, or industrial pollutants at the source by changing the production, industrial, or other waste generating process. In addition, P2 is not limited to hazardous pollutants released to air, water, and land, but also includes activities to reduce the amounts of non-hazardous commercial and household wastes.

P2 is any mechanism that successfully and cost-effectively avoids, prevents, or reduces the sources of pollutant discharges or emissions other than the traditional method of treating pollution at the discharge end of a pipe or stack. A P2 project is one which applies source reduction, recycling, or waste minimization in order to reduce pollution from an installation's current business practices, industrial processes, base operations, or other routine activities.

### **1.4 BENEFITS OF POLLUTION PREVENTION**

As concern for the environment has risen in our society, increased environmental regulation and public awareness have raised the standards, costs, and potential liabilities of waste management practices. Waste and resource management programs that adopt P2 principles can realize benefits on many different fronts:

- Reduced costs associated with the procurement and storage of hazardous materials and subsequent disposal of hazardous waste.
- Reduced costs associated with the management, treatment, and disposal of hazardous wastes.
- Decreased use of energy and water resources.
- Enhanced relations with the public, neighboring communities, and regulators.

- Reduced costs of complying with environmental and hazardous materials regulations, and diminished risk of non-compliance.
- Reduced future compliance liability.
- Improved long-term environmental quality and prevention of environmental degradation.

## **CHAPTER 2**

### **POLLUTION PREVENTION REGULATORY BACKGROUND**

The Army's P2 policies originate in legislation enacted by the U.S. Congress. Executive Orders direct federal agencies, including the Department of Defense (DoD), to conform to Federal legislation and may impose non-legislated requirements as well. The DoD issues directives and instructions in response to the Executive Orders. These DoD policy statements are interpreted and promulgated in Army regulations (ARs), pamphlets, and other policy documents. In addition, Major Army Commands (MACOMs), Major Subordinate Commands, and individual installations may adopt supplemental policies. This section provides summaries of the major laws, executive orders, and DoD policy statements pertaining to P2. Due to the wide-reaching nature of P2 issues and frequent changes to laws and regulations, the list is not intended to be all-inclusive.

#### **2.1 FEDERAL LEGISLATION**

##### **2.1.1 Resource Conservation and Recovery Act (RCRA) of 1976**

An early legal impetus for P2 practices. "...It shall be a condition of any permit issued under this section for the treatment, storage, or disposal of hazardous waste on the premises where such waste was generated that the permittee certify, no less often than annually, that the generator of the hazardous waste has a program in place to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to be economically practicable."

##### **2.1.2 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980**

This act required that generators of hazardous wastes must evaluate and document their procedures for controlling the environmental impacts of their operations.

##### **2.1.3 Hazardous and Solid Waste Amendments (HSWA) of 1984**

This act required all RCRA-regulated generators of hazardous waste to develop waste minimization programs.

##### **2.1.4 Pollution Prevention Act of 1990**

Facilities required to report releases for the Toxic Release Inventory (TRI) under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 must provide documentation of their procedures for preventing the release of or for reusing these materials. However, this act goes beyond wastes designated as hazardous. The intent is to force industries to reduce or prevent pollution at the source. In addition to source reduction, it also emphasizes reuse and closed loop recycling whenever possible. The emphasis is fundamentally different from off-site recycling, treatment, and disposal as primary ways to handle waste. The Pollution Prevention Act first established, as comprehensive national policy, the pollution protection hierarchy described in Chapter 1.

## **2.2 PRESIDENTIAL EXECUTIVE ORDERS**

### **2.2.1 Executive Order 13101, “Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition,” September 1998**

This Executive Order (EO) requires federal agencies to implement acquisition programs aimed at procuring products that are environmentally preferable, energy efficient, and/or contain post-consumer recovered materials. This order supersedes EO 12873.

### **2.2.2 Executive Order 13123, “Greening the Government through Efficient Energy Management,” June 1999**

This EO establishes requirements intended to encourage efficient energy management in the Federal Government. Specific goals of this executive order include:

- Reduce greenhouse gas emissions from facility energy use 30% by 2010 from a 1990 baseline
- Reduce facility energy consumption 30% per square foot by 2005 and 35% by 2010 from a 1985 baseline
- For industrial and laboratory activities, reduce energy consumption 20% by 2005 and 25% by 2010 from a 1990 baseline.

### **2.2.3 Executive Order 13148, “Greening the Government Through Leadership in Environmental Management,” April 2000**

By including many of the P2 elements of several previously existing executive orders, this executive order revokes the following: EO 12843 of April 1993, EO 12856 of August 1993, EO 12969 of August 1995, and Section 1-4 “Pollution Control Plan” of EO 12088 of October 1978. EO 13148 establishes goals that involve establishing environmental management programs as well as goals that involve reaching measurable P2 milestones. The goals that pertain directly to P2 are:

- Reduce Toxic Release Inventory (TRI) Form R releases 10% annually or 40% by 31 December 2006 from a baseline year of 2001. In addition to this reduction goal, note that this EO requires federal facilities to fully comply with the requirements of the Emergency Planning and Community Right to Know Act (EPCRA).
- Reduce the use of Environmental Protection Agency (EPA) priority chemicals 50% by 31 December 2006. Note that the EPA Interagency Workgroup has not yet established the list of priority chemicals. The executive order allows the workgroup until February 2001 to complete the list. The baseline year for the 50% reduction will be the calendar year immediately following the year in which the workgroup establishes the priority chemical list.
- Develop a plan to phase-out the procurement of Class I Ozone Depleting Substances (ODS) by 31 December 2010. The facility must develop this plan by 31 April 2001. Note that the Army established a goal to eliminate all ODS from each Army installation by 31 December 2003 and to develop the phase-out plan by 30 September 2000 (discussed further below).



- Develop a plan that addresses the facility's contribution toward achieving the goals in this executive order. This plan must be developed by March 2002. Note that this P2 plan satisfies this requirement.
- Determine the feasibility of implementing a hazardous material pharmacy system at the facility. The facility must make this determination by April 2002.
- Institute environmentally and economically beneficial practices pertaining to landscaping activities. These practices must be based upon the Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds (60 Fed. Reg. 40837). Landscaping activities must conform to this guidance by October 2001.

#### **2.2.4 Executive Order 13149, "Greening the Government Through Federal Fleet and Transportation Efficiency," April 2000**

This EO establishes goals to improve the average fuel economy to increase the use of alternative fuels for fleet vehicles. Note that this order exempts tactical military vehicles, law enforcement vehicles, and emergency vehicles from its requirements. This executive order supersedes EO 13031 of December 1996. This order established the following specific goals:

- Reduce vehicle petroleum consumption 20% by the end of fiscal year (FY) 2005 from an FY 1999 baseline.
- Increase the average EPA fuel economy rating of cars and light trucks by at least 1 mile per gallon (mpg) by the end of FY 2002 and by 3 mpg by the end of 2005 from an FY 1999 baseline.
- Ensure that alternative fuels account for at least 50% of the fuels used in dual-fuel, alternative fuel vehicles.
- Ensure that at least 75% of car and light truck procurements are alternatively-fueled vehicles.

### **2.3 DEPARTMENT OF DEFENSE (DOD) DIRECTIVES AND INSTRUCTIONS**

#### **2.3.1 DoD Instruction 4715.4, "Pollution Prevention," June 1996**

This document provides explicit guidance on P2 activities. It reiterates the P2 Hierarchy principle, and establishes the DoD P2 measures of merit (MoM) for TRI release reduction, hazardous waste reduction, non-hazardous solid waste diversion, and alternatively-fueled vehicles. Note that the TRI and hazardous waste reduction goals became obsolete on 31 December 1999. As a result, the DoD is currently developing new MoMs that will be incorporated into this plan as soon as they become available.

## **2.3.2 DOD Pollution Prevention and Compliance Metrics, October 2004**

DoD established these metrics to measure progress in the Pollution Prevention and Compliance programs in support of the defense mission. Each program area has a set of broad overall goals with specific metrics to measure DoD's progress towards meeting the goals. The metrics process requires continuous review and periodic adjustments, as necessary. The Pollution Prevention and Compliance programs focus on enhancing and sustaining the mission by:

- Supporting the war fighter today and in the future;
- Ensuring adequate resource capability for the war fighter;
- Improving human health and the environment;
- Influencing the acquisition and weapon system life-cycle process;
- Making efficient investments in pollution prevention; and
- Conducting operations in a cost effective manner.

## **2.3.3 Memorandum, Assistant Secretary for Installations, Logistics, and Environment, "Ozone-Depleting Chemicals (ODC) Elimination at Army Installations," 13 February 1996**

With this memorandum, the Assistant Secretary of the Army for Installations, Logistics, and Environment established an Army-wide goal to completely eliminate Class I ODS from all Army installations by 31 December 2003.

## **2.4 U.S. ARMY REGULATIONS AND GUIDANCE**

### **2.4.1 AR 200-1 Environmental Protection and Enhancement, 21 February 1997**

This regulation provides a brief overview of environmental programs and requirements. It does not provide a complete listing of requirements or detailed guidance on complying with environmental laws and regulations. This regulation supplements Federal, state, and local environmental laws for preserving, protecting, and restoring the quality of the environment. It also integrates pollution prevention, natural and cultural resources, and the National Environmental Policy Act (NEPA) into the Army Environmental Program.

## **2.5 FINAL GOVERNING STANDARDS (FGS) FOR THE NETHERLANDS**

### **2.5.1 FGS Chapter 6, "Hazardous Waste", February 2003**

This chapter contains criteria for a comprehensive management program to ensure that hazardous waste is identified, stored, transported, treated, disposed and recycled in an environmentally-sound manner.

### **2.5.2 FGS Chapter 9, "Petroleum, Oil and Lubricants", February 2003**

This chapter contains criteria to control and abate pollution resulting from the storage, transport, and distribution of petroleum products.

### **2.5.3 FGS Chapter 18, "Spill Prevention and Response Planning", February 2003**

This chapter contains criteria to plan for, prevent, control, and report spills of petroleum, oil, and lubricants (POL) and hazardous substances.

#### **2.5.4 FGS Chapter 19, “Underground Storage Tanks”, February 2003**

This chapter contains criteria to control and abate pollution resulting from POL products and hazardous materials stored in underground storage tanks (USTs).

### **2.6 DUTCH POLLUTION PREVENTION LEGISLATION**

#### **2.6.1 Environmental Management Act (Wet Milieubeheer), March 1993**

This law incorporates Integrated Pollution Prevention and Control (IPPC) by integrating site licensing and permitting into a single prescribed operational/environmental permit with the aim to protect the environment on the basis of the ‘As Low As Reasonably Achievable’ (ALARA) or ‘Best Available Techniques Not Entailing Excessive Costs’ (BATNEEC) principles.

#### **2.6.2 Soil Protection Act (Wet Bodembescherming)**

This law aims to protect soil and groundwater and to apportion liability for pollution of soil and groundwater. This law enables authorities the opportunity to require an investigation or remediation of a site.

#### **2.6.3 Surface Water Protection Act (Wet Verontreiniging Oppervlaktewateren)**

The law aims to protect surface water bodies from pollution as a result of wastewater discharge activities. An additional separate permit from the operational/environmental permit, prescribed by the Environmental Management Act, may be necessary under the Surface Water Protection Act in the event of direct wastewater discharge to surface water bodies.

#### **2.6.4 Air Emission Act (Wet Luchtverontreiniging)**

This law aims for the control and reduction over time of general air emissions generated from a site.

## **CHAPTER 3**

### **INSTALLATION POLLUTION PREVENTION PROGRAM**

#### **3.1 POLICY**

The USAG Schinnen is committed to an active policy of protecting the environment through the following efforts:

- Providing a clean and safe environment in our community
- Ensuring a safe and healthy workplace for our staff
- Complying with all applicable laws and regulations
- Reducing the use of hazardous substances
- Reducing releases of pollutants to the environment
- Conserving energy and natural resources
- Maximizing recycling efforts
- Promoting pollution prevention through education, training, and awareness

To accomplish these objectives, the USAG Schinnen continuously identifies opportunities to reduce or eliminate pollution through source reduction and other prevention methods. This policy extends to all environmental media including hazardous waste, solid waste, air, water, and wastewater.

USAG Schinnen is committed to reducing the amount and toxicity of pollution that it generates. As part of this commitment, the USAG gives priority to source reduction. Where source reduction is not feasible, the USAG Schinnen will investigate and implement other prevention measures such as recycling, treatment, and controlled disposal.

Pollution prevention is the responsibility of everyone at the USAG Schinnen.

#### **3.2 POLLUTION PREVENTION MANAGEMENT STRUCTURE**

USAG Schinnen manages its overall environmental program through a series of defined responsibilities. As an aspect of the environmental program, the installation also manages its pollution prevention program in this manner. The various levels of responsibility for environmental management are outlined in the following Sections (3.2.1 through 3.2.5).

##### **3.2.1 Command Level**

With regards to the environmental program, USAG Schinnen command personnel are responsible for establishing overall policies, instituting regulations, and setting goals. In addition, they are responsible for establishing budgets and authorizing funding for the overall program and for specific projects. Command and Directorate level personnel stay involved in environmental activities primarily through regular meetings of the USAG Schinnen Environmental Quality Control Committee (EQCC) which meets once per quarter.

### **3.2.2 Primary Level**

The USAG Schinnen Environmental Management Office (EMO) maintains the principal responsibility for environmental oversight and management. The environmental management office consists of personnel who are each responsible for managing various environmental programs such as pollution prevention, hazardous waste, solid waste, air emissions, above and underground storage tanks, etc.

### **3.2.3 Task Level**

This level consists mostly of contracted organizations that provide the USAG Schinnen with a specific work product. Some examples may include the various contractors that develop USAG Schinnen Management Plans.

### **3.2.4 Resource Level**

Resources are typically regarded as various personnel on post who have environmental training, experience, or knowledge and can contribute to specific aspects of environmental program management. Resources include those with extensive environmental knowledge such as EMO personnel who are not directly responsible for a specific program but who may lend advice and assistance to that program's manager.

### **3.2.5 Operator Level**

This level of personnel has the responsibility of providing technical information about the existing processes and potential process changes to operations and waste generation activities to the primary level personnel. Some specific examples of this level include for example the Directorate of Public Works (DPW) Operations & Maintenance Division (O&M) or the Separate or Recycle Trash (SORT) Center.

## **3.3 BASELINE DEVELOPMENT**

The baselines for the USAG Schinnen P2 objectives are primarily derived from the pollution reduction goals established by "Greening of the Government" executive orders and the Department of Defense Pollution Prevention and Compliance Metrics from October 2004. The baseline inventory<sup>3</sup> was a collection of information and data, which identified resources used and waste streams generated by installation activities at the USAG Schinnen. Where available, the baseline inventory included quantities, purchase and/or disposal costs and location of activities where resources are used and waste streams are generated. The following resources and waste streams were evaluated as baselines and are quantitatively identified, if and where applicable to this P2MP, in chapters 5 through 9 of this plan.

- Hazardous waste generation
- Hazardous material use
- Air emissions
- Ozone depleting substances
- Non-hazardous solid waste generation

---

<sup>3</sup> Pollution Prevention Program, USAG Schinnen, the Netherlands, Baseline Inventory – Final, Prepared by AMEC Earth & Environmental GmbH, December 2004.

- Energy consumption
- Potable water consumption
- Wastewater discharge
- Fuel use for non-tactical fleet vehicles owned or leased by the USAG Schinnen

### **3.4 OPPORTUNITY ASSESSMENTS**

When reduction requirements are determined, options for meeting the requirements must be identified. These options are identified through a pollution prevention opportunity assessment (P2OA). P2OA examines current processes and identifies and evaluates alternatives for pollution prevention. Projects identified by P2OAs must have complete data, where available, to show the cost benefit of the project.

Opportunity Assessments are the method of identifying process improvements or options. Conducting an opportunity assessment involves examining all input sources, material usage, and waste generation by type and weight, and determining practical and economical options for reduction. This generally involves examining each process involving a targeted substance to determine ways to avoid use or minimize generation of that substance. Detailed baseline information characterizing material use and waste streams for each process may be gathered concurrently with the assessment process. Opportunity assessments may be performed by trained post level or MACOM personnel, or contractors and, to be effective, must have the involvement of process-level personnel.

Chapters 5 through 9 of this document represent the results of the most recent P2OA<sup>4</sup> for each chapter's respective media.

### **3.5 POLLUTION PREVENTION GOALS**

Chapters 5 through 9 of this plan describe the USAG Schinnen P2 goals with respect to each environmental media area applicable to the USAG Schinnen P2 program. The installation developed these goals based on environmental laws, executive orders, and Department of Defense policies.

### **3.6 IMPLEMENTATION AND EVALUATION**

This section describes some of the methods and tools the installation uses to track and document its environmental efforts such as P2 projects and initiatives.

#### **3.6.1 Environmental Quality Report**

This report is part of an automated system used to collect a wide variety of USAG Schinnen environmental information, including compliance, conservation, program management, and P2 programs. The primary goal of an Environmental Quality Report (EQR) is to provide DoD with the information it requires as well as providing HQDA, MACOM, major subordinate commands (MSC), and installations with critical management information while minimizing short suspense tasking to USAG personnel. The EQR program is a result of the 1996 Defense Environmental Quality Program Annual Report to Congress, RCS DD-A&T (A)

---

<sup>4</sup> Pollution Prevention Program, USAG Schinnen, the Netherlands, Pollution Prevention Opportunity Assessment – Final Report, Prepared by AMEC Earth & Environmental GmbH, March 2005.

1997. All data elements in the EQR are based on the DoD RCS-A&T (A) 1997 reporting protocol, and other law(s) and regulation(s) reporting requirements. All of which provide users and policy makers with periodic updates on critical data within the Army's environmental program. The EQR serves as the source of data for: annual environmental quality (EQ) reports to Congress; semi-annual EQ reports to the DoD; quarterly reports for the Quarterly Army Performance Review; MACOM EQ In Progress Reports (IPRs); USAG Management Steering Committee meetings; and semi-annual EO reports to MACOMs.

### **3.6.2 Army Environmental Program Requirements**

USAG Schinnen personnel use the Environmental Program Requirements (EPR) database to plan, program, budget and forecast costs to manage the environment; to practice good environmental stewardship; and to attain and maintain compliance with existing and pending Federal, State, local environmental laws and regulations. It is used to show past expenditures; to track project execution and performance; to refine and validate requirements for the budget year; and to plan and program requirements and resources in the out-years.

### **3.6.3 Environmental Performance Assessment System**

This system, known as the EPAS, is an Army-wide program that documents an installation's compliance status on a 3-year cycle. As a component of the EPAS, assessors evaluate the USAG Schinnen P2 program in terms of its compliance with many of the directives and executive orders described in Chapter 2. This evaluation is included as part of a document called the Environmental Performance Assessment Report (EPAR). After each time the USAG undergoes an environmental performance assessment, the assessors write an EPAR and provide copies to the installation and its MACOM. The installation then works with the MACOM to develop an Installation Corrective Action Plan (ICAP). Developing the ICAP serves as an opportunity to consider and plan for P2 projects that can help achieve and maintain compliance.

## **3.7 REPORTING REQUIREMENTS**

The USAG Schinnen has the following P2 reporting requirements:

- Hazardous waste generator biennial or annual report, from RCRA
- Environmental Quality Report (EQR) hazardous waste disposal and recycling roll-ups, from AR 200-1
- Environmental Program Requirements (EPR) for programming, budgeting, and execution for all environmental projects, including P2, from AR 200-1
- ODS procurement approvals and determinations, from Section 326 of the National Defense Authorization Act for FY 1993
- Solid Waste Annual Report (SWAR)
- Installation Status Report Part II (Environment)
- EPRCA Tier I/II Reports

### **3.8 POLLUTION PREVENTION PROJECT FUNDING**

Pollution Prevention projects are funded from the appropriate account of the proponent's operating budget.

### **3.9 POLLUTION PREVENTION AWARENESS TRAINING PROGRAM**

The USAG Schinnen will implement a P2 Awareness Training Program, thereby increasing awareness among staff and residents regarding general P2 issues with particular focus on water efficiency and energy efficiency.

P2 Awareness Training should be conducted on a yearly basis for all units, activities, and/or tenant organizations that generate and/or manage pollution and/or waste and during new-comer In-Processing. A record of attendance and trainings conducted should be maintained within the EMO. Attendance and a record of the P2 material covered during the training sessions can be maintained through the use of a P2 Awareness Training Form, as depicted in Table 5.

Initial P2 Awareness Training sessions should cover, at a minimum, the following P2 material and items:

- What is P2 and provide definitions and meaning of related terms;
- Benefits of P2;
- Specifics of the P2 Program at USAG Schinnen and individuals respective roles and responsibilities, where applicable;
- Example P2 opportunities and projects;
- Methods for achieving energy efficiency; and
- Methods for achieving water efficiency.



**Table 5: Pollution Prevention Awareness Training Program: P2 Awareness Training Form**

|   |   |                               |
|---|---|-------------------------------|
| <b>Trainer:</b>   | <b>Date:</b>                            |                               |
| <p><b>The P2 Awareness Training session included a review and discussion of the following items:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> What is Pollution Prevention (P2)</li> <li><input type="checkbox"/> Benefits of P2</li> <li><input type="checkbox"/> P2 Program at USAG Schinnen</li> <li><input type="checkbox"/> Example P2 opportunities</li> <li><input type="checkbox"/> Methods for energy efficiency</li> <li><input type="checkbox"/> Methods for water efficiency</li> </ul> <p><b>Other topics and/or discussion items reviewed included the following:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul> |   |                               |
| <b>Participant's Name</b>   | <b>Unit/Title &amp; Phone Extension</b> | <b>Participants Signature</b> |
|   |   |                               |
|   |   |                               |
|   |   |                               |
|   |   |                               |
|   |   |                               |
|   |   |                               |
|   |   |                               |
|   |   |                               |
|   |   |                               |
|   |   |                               |
|   |   |                               |
|   |   |                               |
|   |   |                               |
| <b>Trainer's Signature:</b>   |   |                               |

## CHAPTER 4

### COMPLIANCE THROUGH POLLUTION PREVENTION

#### 4.1 DESCRIPTION OF COMPLIANCE THROUGH P2

Pollution Prevention can be a strong tool that the USAG can use to reduce its compliance burden. Since the concept of P2 was first introduced, it has been accepted that P2 can improve a USAG's compliance status. However, this benefit was taken as a matter of course but was not widely explored. This section represents the USAG efforts to categorize and document its compliance benefit. The following example illustrates the concept of compliance through prevention at hypothetical Installations (A, B and C).

**Example:**

*Installation A has five motor pools that generate used solvent as a hazardous waste. Recently, Installation A implemented a pollution prevention initiative that could double the life of the solvent, which in turn, reduced the amount of used solvent generated by 50%. Although this initiative has obvious benefits, it does not reduce the installation's compliance burden as much as might first be expected. This is because each of the five motor pools are still generating used solvent as a hazardous waste (albeit half as much). As a result, the installation must still ensure that these five motor pools operate in full compliance with hazardous waste storage and handling laws. In this light, the installation has received little compliance benefit aside from perhaps having to fill out a few less hazardous waste manifests.*

*Installation B also had five motor pools that generated used parts washing solvent as a hazardous waste. Recently, however, this installation consolidated these motor pools so that they are now housed in a single facility. This consolidation has allowed the activities to share resources which, in turn, reduced solvent use and generation by 25%. This reduction is not as much as that realized by installation A. However, Installation B has gained a benefit in that it now only has to manage a single hazardous waste site rather than five separate ones. Installation B, therefore, has realized a compliance benefit by reducing the number of its compliance sites.*

*Installation C also has five motor pools that generate used solvent. This Installation has recently implement Installation A's initiative that reduced solvent use and generation by 50% at each of its motor pools. At Installation C, however, the used solvent represented a large percentage of the Installation's total hazardous waste generation. So large in fact, that by reducing it by 50%, the Base Support Battalion downgraded its hazardous waste generator status from large quantity generator to small quantity generator. So even though Installation C must still manage these five separate hazardous waste generation sites, it may do so under more relaxed standards. Installation C, therefore, has realized a compliance benefit by reducing one of its compliance thresholds.*

#### 4.2 COMPLIANCE SITES

A compliance site is a facility or process that falls under environmental regulation. The following sections outline the main compliance sites at the USAG Schinnen.

#### 4.2.1 Hazardous Materials and Hazardous Waste Storage Areas

Table 6 below is provided to track the progress that the USAG Schinnen has made in reducing its number of hazardous material/waste compliance sites, by listing the number of Hazardous Material Storage Areas (HMSA), Hazardous Waste Storage Areas (HWSA) and Hazardous Waste Accumulation Points (HWAP).

**Table 6: Quantity of Hazardous Material/Waste Storage Areas and Accumulation Points**

| Facility Type | Quantity |         |         |         |         |
|---------------|----------|---------|---------|---------|---------|
|               | FY 2003  | FY 2004 | FY 2005 | FY 2006 | FY 2007 |
| HMSA          | 13       | 11      |         |         |         |
| HWSA          | 1        | 1       |         |         |         |
| HWAP          | 4        | 4       |         |         |         |

The number of HMSA includes seven locations (as of FY 2003) at the USAG Schinnen HQ Installation and six locations at CDC Brunssum. The seven hazardous materials storage activities at the USAG Schinnen HQ Installation are dispersed throughout the installation at the following locations:

- Pesticide storage in building 16;
- Hazardous materials storage including cleaning products for the custodial contractor in building 22;
- Hazardous material storage for Defense Commissary Agency (DECA) in building 25;
- Storage of fire extinguishers for the Directorate of Public Works (DPW) Fire & Emergency Service (F&ES) Division in building 35;
- POL storage for the DPW Operations and Maintenance Division in building 35;
- Paint products for the paint shop in building 35; and
- Overall hazardous materials storage at the Hazardous Material Control Center (HMCC) in building 31.

The single HWSA is located at building 33 of the USAG Schinnen HQ Installation. The four HWAP points are located at the SORT Center (building 47), Bowling Center (building 40), Army/Air Force Exchange Service (AAFES) Car Care Center (building 28) and the Supply Shop (building 18).

As part of this P2 Program and P2MP, initiatives have commenced to reduce the number of HMSAs at both the USAG Schinnen HQ Installation from seven locations to one (the HMCC) and CDC Brunssum from six locations to three. Current regulations and hazardous material management practices require that each storage area has an annual liquid-tight flooring inspection by a host-nation certified inspector, is equipped with sufficient spill prevention equipment and measures, and has periodic fire, safety and environmental inspections conducted internally. By reducing the total number of HMSA, USAG Schinnen reduces its compliance burden and respective costs by inspecting, maintaining and managing fewer locations. Further detailed information on this initiative is provided in Sections 5.5.1 and 5.5.2.

#### **4.2.2 Permitted Air Emission Sources**

USAG Schinnen has no major air emission sources. USAG Schinnen holds a single operational/environmental permit for all on site activities. The permitted activities are based on the requirements stipulated in the FGS for the Netherlands of February 2003. The USAG Schinnen has no separately permitted air emission sources.

#### **4.2.3 Permitted Solid Waste Disposal Facilities**

USAG Schinnen does not operate any solid waste disposal/treatment facilities. The USAG has a SORT Center for the primary collection and sorting of solid waste generated at the USAG Schinnen prior to being collected, transported and disposed or recycled by a separate licensed waste disposal contractor. All activities undertaken at the SORT Center are regulated under the USAG's single operational/environmental permit, which refers to the requirements of Chapter 7.3 of the FGS for the Netherlands of February 2003. The SORT Center has separate containers for rubbish, paper and cardboard, plastic bottles, glass, scrap metals and cans, old clothes and shoes, wood, yard waste, vehicle tires, street sweep, household hazardous waste, debris, electronic waste and refrigerators.

#### **4.2.4 Permitted Underground Storage Tanks and Oil/Water Separators**

USAG Schinnen has three underground storage tanks (USTs):

- Two 30,000 liter (L) gasoline USTs at the AAFES motorpool; and
- One 30,000L UST (divided into 15,000L for diesel and 15,000L for gasoline) at the fueling station.

USAG Schinnen has three oil/water separators:

- 1,300L capacity oil/water separator at the fueling station;
- 1,000L capacity oil/water separator at the Car Wash; and
- 800L capacity oil/water separator at the Garage.

The above listed USTs and oil/water separators are regulated under the USAG's overall operational/environmental permit which refers to the requirements of Chapters 9 and 19 of the FGS for the Netherlands of February 2003.

#### **4.2.5 Permitted Drinking Water Sites**

USAG Schinnen has one chlorination unit located at building 29. The chlorination unit chlorinates incoming drinking water from the municipal water mains. The unit is regulated under the USAG's overall operational/environmental permit which refers to the requirements of chapters 3.3.1 through 3.3.5 of the FGS for the Netherlands, February 2003.

### **4.3 COMPLIANCE THRESHOLDS**

Compliance thresholds are quantitative limits that trigger environmental compliance requirements once they are exceeded. The USAG Schinnen has no compliance thresholds which may trigger varying environmental regulations or requirements.

## CHAPTER 5 HAZARDOUS MATERIALS AND WASTE

### 5.1 PREVENTION GOAL

USAG Schinnen's hazardous materials/waste reduction goal is to show a continuous annual reduction in the overall disposal of hazardous wastes and a reduction in disposal and maintenance costs. For the purposes of this plan, hazardous wastes include all wastes listed in the hazardous waste disposal inventories managed by the EMO of the USAG Schinnen and that require hazardous waste manifests for disposal.

### 5.2 BASELINE AND PROGRESS

**Table 7: Baseline and Progress of Total Hazardous Waste Disposed**

| Hazardous Waste<br>(kg and cost disposed per fiscal year) |                       |         |         |         |         |         | Target:<br>continuous<br>reduction |
|---|-----------------------|---------|---------|---------|---------|---------|------------------------------------|
| Baseline  |                       |         |         |         |         |         |                                    |
| Year  | FY 2004               | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010                            |
| Mass (kg)   | 161,560 <sup>5</sup>  |         |         |         |         |         |                                    |
| Cost (€)  | €215,034 <sup>6</sup> |         |         |         |         |         |                                    |

### 5.3 DESCRIPTION OF MAJOR HAZARDOUS WASTE GENERATING ACTIVITIES

The main hazardous waste generating activities at the USAG Schinnen are described in the following section.

#### 5.3.1 Army Material Command

The Army Material Command (AMC) is the largest hazardous waste generator supported by the USAG Schinnen resulting in approximately 46% of the total hazardous waste disposed in FY 2004. AMC comprised of three different locations: CEGE Brunssum, Vriezenveen and Surface Supply Agency (SSA) Egelshoven. CEGE Brunssum and Vriezenveen closed operations in February 2004 and were not included in the FY 2004 Baseline Inventory. SSA Egelshoven is expected to close operations and cease generating hazardous waste in August 2005. Hazardous waste from the AMC comprised mostly of battery acid and lead-acid batteries, fire extinguishers, gas cylinders, paint and some oil contaminated material and cleaning components. The amount and cost of hazardous waste disposal is expected to decrease with the final closure of the AMC.

<sup>5</sup> From: Baseline Inventory, December 2004

<sup>6</sup> From: Baseline Inventory, December 2004

### **5.3.2 AAFES**

AAFES is the second largest hazardous waste generator at the USAG Schinnen accounting for approximately 21% of the total hazardous waste disposed in FY 2004. The significant hazardous waste streams generated from the AAFES Car Care Center and Fueling station (located at buildings 28 and 30) includes waste oil and oil contaminated waste, vehicle tires, sludge from the oil/water separators and grease separators, and some lead-acid batteries and electronic waste.

### **5.3.3 Directorate of Public Works**

The Directorate of Public Works (DPW) contains seven main divisions: Business Operations and Integration Division, Engineering Division, Operations and Maintenance Division (O&M), Fire and Emergency Services Division (F&ES), Environmental Division, Master Planning Division and the Housing Division. The main hazardous waste generators within the DPW are the F&ES Division and the O&M Division which comprises of the Carpenter Shop, Paint Shop, SORT Center Operator, Electrician, Plumber, Buildings and Grounds, and maintenance workers. DPW operations accounted for approximately 13% of the total hazardous waste generated in FY 2004. The main hazardous waste types generated from DPW activities includes street sweep, fire extinguishers, oil contaminated material and refrigerators.

### **5.3.4 Directorate of Community Activities**

The Directorate of Community Activities (DCA) operates numerous recreational activities at the USAG Schinnen, including the Bowling Center in building 40. The main source of hazardous waste generated from DCA activities is sludge from the grease separators, resulting from deep fat frying oil, which is generated by the facility's food service operation. The DCA accounted for only 6% of the total hazardous waste disposed from the USAG Schinnen in FY 2004.

### **5.3.5 Directorate of Logistics**

The Directorate of Logistics (DOL) accounted for only 5% of the total hazardous waste disposed from the USAG Schinnen in FY 2004, which resulted primarily from sludge waste from the oil/water separators.

## **5.4 PAST COMPLETED POLLUTION PREVENTION INITIATIVES**

### **5.4.1 Centralized Hazardous Materials Control Center**

**Description:** USAG Schinnen has established a Hazardous Materials Control Center (HMCC) to serve as a centralized point for hazardous material procurement, tracking, and management as per the P2MP of June 1999. The HMCC was established in 2002; however currently there are still five different Hazardous Material Storage Areas (HMSAs) throughout the USAG Schinnen HQ Installation and six other HMSAs at CDC Brunssum. Consolidation of all HMSAs makes part of additional P2 initiatives described in further detail in Sections 5.5.1 and 5.5.2. Furthermore, the implementation of a Hazardous Material Tracking System for the HMCC is an additional P2 initiative described in further detail in Section 5.6.3.

Funding for this P2 initiative was provided by Validated Environmental Pollution Prevention (VEPP).

**Environmental Benefit:** The use of a centralized HMCC would reduce the quantity of hazardous materials procured, used and stored and thus reduce costs by controlling the acquisition, procurement, supply and utilization of hazardous materials. It is expected that this initiative would reduce the amount of hazardous waste disposed due to shelf life expiration.

**Economic Benefit:** Maintaining the HMCC will eliminate potential hazardous waste generated as a result of excess materials and shelf life expirations thereby reducing hazardous waste disposal costs.

#### **5.4.2 Aerosol Can Puncturing Unit**

**Description:** In 2000, USAG Schinnen implemented and currently maintains an aerosol can puncturing unit at the SORT Center as per the P2MP of June 1999. The puncturing unit is manually operated by placing the aerosol can in a cylinder attached to a disposal drum. By turning the handle of the cylinder, a puncture pin is activated that pierces the can. The contents of the can are then filtered through granular activated charcoal filters and any remaining liquid is drained through a sealed channel directly into the disposal drum.

Funding for this P2 initiative was provided by VEPP.

**Environmental Benefit:** The use of an aerosol can puncturing unit eliminates the disposal of aerosol cans as hazardous waste, thereby reducing the amount and cost of hazardous waste disposal.

**Economic Benefit:** This P2 project eliminates the cost of disposing aerosol cans as a hazardous waste stream. Aerosol cans can be sold as scrap metal in Europe if they are punctured and their contents and propellants are removed.

#### **5.4.3 Reduction of Oil Contaminated Waste via Absorbent Reuse and Drip Pans**

**Description:** In 2000 USAG Schinnen implemented and is currently maintaining measures for the reduction of oil contaminated waste at the motorpool by reusing absorbent material and using better drip pans, as per the P2MP of June 1999.

The absorbent reuse option utilizes a filter attached to a 55-gallon drum to screen out large, saturated particles of absorbents, thereby allowing smaller and unsaturated material to be reused. The screening system consists of a modified 55-gallon drum with a mesh screen on top and a hole in the side to enable the user to scoop out filtered absorbent for reuse. Used absorbent is sifted through the screen, which captures larger particles of absorbent and other floor debris. The screen is then removed and the waste material is disposed in the used absorbent waste stream. The remaining absorbent is immediately available for reuse. USAG Schinnen is also currently using larger, interconnected drip pans to capture most of the oils spilled from various types of vehicles at the motorpool.

Funding for this P2 initiative was provided by VEPP.

**Environmental Benefit:** The use of drip pans to prevent spills and the reuse of absorbent material through filtering the used absorbent material reduces the overall amount of oil contaminated waste generated.

**Economic Benefit:** This P2 project eliminates the cost of disposing oil contaminated waste as a hazardous waste stream; reduces labor hours required to clean spills; and the need and associated costs to purchase fresh absorbent material and rags.

## **5.5 CURRENT POLLUTION PREVENTION INITIATIVES**

### **5.5.1 Consolidate Hazardous Materials Storage Activities to HMCC**

**Description:** Hazardous materials storage activities at USAG Schinnen HQ installation are dispersed throughout the installation at the following storage areas:

- pesticide storage in building 16;
- hazardous materials storage including cleaning products for the custodial contractor in building 22;
- hazardous materials storage for DECA in building 25;
- storage of fire extinguishers for the DPW F&ES Division in building 35;
- POL storage for the DPW O&M Division in building 35;
- paint products for the Paint Shop in building 35; and
- overall hazardous material storage at the HMCC in building 31.

Current hazardous material management practices require that each of these storage areas have annual liquid-tight flooring inspections by a host nation certified inspector, are equipped with sufficient spill preventive equipment and measures, and have periodic fire, safety and environmental inspections conducted internally by the EMO.

This P2 opportunity suggests consolidating all hazardous materials storage activities at the USAG Schinnen HQ Installation to the HMCC in building 31. The HMCC is large and contains enough storage space with sufficient spill preventive equipment to house all hazardous materials storage activities.

USAG Schinnen has already commenced consolidating the Hazardous Materials Storage Areas by reducing its total number of storage areas to five locations in 2004.

**Advantages:**

- More efficient hazardous material management practices.
- Safer working environment.
- Minimize contractor inspection costs.
- Minimize internal inspections and subsequent labor hours.
- Minimize compliance load.



**Disadvantages:**

- Limited hazardous material storage space for the future if general amounts of materials increase.

**Environmental Benefit:**

- Reduce potential areas subject to environmental impacts as a result of spills or improper hazardous material management.

**Economic Feasibility/Cost Estimate:**

- The following payback calculation assumes no capital start-up costs are required to move hazardous materials from one location to another.
- Cost estimates for annual floor certifications, purchasing of spill preventive equipment and in-house management time were provided by the USAG Schinnen EMO. The cost estimates for contractor floor certifications is US\$500 per storage location and the annual purchase and maintenance of spill preventive equipment is US\$100 per storage location. The internal labor-hours to conduct fire, safety and environmental inspections are approximately 16 hours per storage location at US\$24 per hour.

**Table 8: Payback Calculation for Consolidating Hazmat Storage at HQ Installation**

| Parameter   | Cost (US\$) |
|---|-------------|
| Capital/Start-up cost for P2 alternative  | 0           |
| Current annual cost for floor certification of all Hazmat storage locations (7 locations)                               | 3500        |
| Current annual cost for spill preventive equipment for all Hazmat storage locations (7 locations)                       | 700         |
| Current annual costs for internal inspections by EMO of all Hazmat Locations (7 locations)                              | 2,688       |
| Annual cost with P2 alternative (floor certification, spill preventive equipment and internal inspection for HMCC only) | 984         |
| Annual savings after break even point   | 5,904       |
| Payback period  | Immediate   |

**5.5.2 Reduce Hazardous Materials Storage Areas at CDC Brunssum**

**Description:** Hazardous materials storage activities at CDC Brunssum are dispersed throughout the facility at six different locations. Current hazardous material management practices require that each of these storage areas have annual liquid-tight flooring inspections by a host nation certified inspector and are equipped with sufficient spill preventive equipment and measures, and have periodic fire, safety and environmental inspections conducted internally by the EMO.

This P2 opportunity suggests consolidating the six hazardous materials storage areas at CDC Brunssum into three storage areas. These three storage areas contain enough storage space with sufficient spill preventive equipment to house all hazardous materials storage activities at CDC Brunssum.

USAG Schinnen has already commenced this P2 initiative at CDC Brunssum by preparing the new storage areas (remaining three areas) for the additional stock of materials from the areas selected to close.

**Advantages:**

- More efficient hazardous material management practices.
- Safer working environment.
- Minimize contractor inspection costs.
- Minimize internal inspections and subsequent labor hours.
- Minimize compliance load.

**Disadvantages:**

- Limited hazardous material storage space for the future if general amounts of materials increase.

**Environmental Benefit:**

- Reduce potential areas subject to environmental impacts as a result of spills or improper hazardous material management.

**Economic Feasibility/Cost Estimate:**

- The following payback calculation assumes no capital start-up costs are required to move hazardous materials from one location to another.
- Cost estimates for annual floor certifications, purchasing of spill preventive equipment and in-house management time were provided by the USAG Schinnen EMO. The cost estimates for contractor floor certifications is US\$500 per storage location and the annual purchase and maintenance of spill preventive equipment is US\$100 per storage location. The internal labor-hours to conduct fire, safety and environmental inspections are approximately 16 hours per storage location at US\$24 per hour.

**Table 9: Payback Calculation for Consolidating Hazmat Storage at CDC Brunssum**

| Parameter   | Cost (US\$) |
|---|-------------|
| Capital/Start-up cost for P2 alternative  | 0           |
| Current annual cost for floor certification of all Hazmat storage locations (6 locations)                                 | 3000        |
| Current annual cost for spill preventive equipment for all Hazmat storage locations (6 locations)                         | 600         |
| Current annual costs for internal inspections by EMO of all Hazmat Locations (6 locations)                                | 2,304       |
| Annual cost with P2 alternative (floor certification, spill preventive equipment and internal inspection for 3 locations) | 2,952       |
| Annual savings after break even point   | 2,952       |
| Payback period  | Immediate   |

## **5.6 POTENTIAL POLLUTION PREVENTION INITIATIVES**

### **5.6.1 Reduction of Oil Contaminated Waste via an Oil Suction System**

**Description:** An oil suction system for the motorpool can be implemented to eliminate oil spills while draining oils from vehicles during oil changing procedures and maintenance activities. This initiative involves replacing the standard oil-drain plugs with plugs having special fittings whereby the oil from vehicle engines can be removed with a suction device. Drain plugs with special fittings are easily installed during routine maintenance. The plugs can also be removed, just like standard plugs, to drain the oil when vehicles are maintained during training or field maneuvers.

This P2 initiative was addressed in the P2MP of June 1999 with a proposed implementation date of 2006. The USAG Schinnen has not yet implemented this P2 project. The funding source for this P2 project was allocated as VEPP.

**Environmental Benefit:** The use of an oil suction system eliminates potential oil spills and reduces the associated generation of oil contaminated waste such as rags and absorbent.

**Economic Feasibility/Cost Estimate:** This P2 project eliminates the cost of disposing oil contaminated waste as a hazardous waste stream; reduces labor hours required to clean spills; and the need and associated costs to purchase fresh absorbent material and rags.

Based on the data and calculations from the USAG Schinnen P2MP of June 1999, the implementation cost for installing the oil suction system would be US\$ 1,952 based on initial capital costs and one year of operational costs. The expected savings were US\$ 2,108/year with a payback period of 0.68 years. These estimates are based on the assumption that drain plugs will be supplied for 100 vehicles and two suction devices for the motorpool.

### **5.6.2 Acid Battery Life Extension**

**Description:** Routine maintenance conducted at the motorpool on various Army vehicles generates lead-acid batteries that require disposal as hazardous waste. Such lead-acid batteries typically have 1 to 2 year life spans. By implementing solargizers, which are solar powered battery conditioning devices, the motorpool may extend the battery life. Solargizers convert solar energy into electric impulses, which when converted to lead-acid batteries, prevent the sulfurization of the battery plates and thus extends the battery life from an average of 1 year to approximately 5 years. This P2 project proposes to replace lead-acid batteries approximately every 3 years, reducing both battery purchase and disposal costs. Solargizer units can be installed in about one-half hour during routine semi-annual maintenance.

This P2 initiative was addressed in the P2MP of June 1999 with a proposed implementation date of 2000. The USAG Schinnen has not yet implemented this P2 project. The funding source for this P2 project was allocated as VEPP.

**Environmental Benefit:** The use of solargizers will extend lead-acid battery life thereby reducing new battery purchase and the frequency of hazardous waste disposal. Solargizers will also reduce the production of waste sulfuric acid and electrolyte solution, which are hazardous wastes.

**Economic Feasibility/Cost Estimate:** This P2 project reduces the costs of purchasing new batteries as they will be needed less often; reduces disposal costs of lead-acid batteries as

hazardous waste because they will last longer; and reduces labor costs associated with the current frequent replacement required for spent batteries.

Based on the data and calculations from the USAG Schinnen P2MP of June 1999, the implementation cost for installing the oil suction system would be US\$ 11,250 based on initial capital costs and one year of operational costs. The expected savings were US\$ 5,230/year averaged over 10 years with a payback period of 1.56 years. These estimates are based on the assumption that 100 solargizers will be purchased to attach to vehicles with lead-acid batteries.

### **5.6.3 Hazardous Material Tracking System**

**Description:** Currently, Excel spreadsheets are maintained individually for separate hazardous material storage areas. With consolidation of hazardous materials storage activities to the one HMCC (see Section 5.5.1), this P2 opportunity suggests implementing an updated Hazardous Materials Tracking System or database for the HMCC. Such a system or database can minimize un-used or expired shelf-life hazardous materials, identify the potential for re-use of obsolete materials in other departments, and evaluate the annual use of certain materials in order to reduce incidents of excessive or unnecessary ordering of materials.

**Environmental Benefit:** This P2 initiative can promote more efficient hazardous materials management practices and potentially reduce the amount of hazardous waste generated as a result of shelf-life expiration.

**Economic Feasibility:** The feasibility of implementing such a tracking system or database at the HMCC is a P2 opportunity that can be evaluated in a follow-up P2 project, upon completion of consolidating all hazardous materials storage locations to the HMCC. Once storage locations are consolidated, a further detailed on-site evaluation of the hazardous materials present at the HMCC would be required.

### **5.6.4 Control Cleaning Agents Internally**

**Description:** Current cleaning activities at the USAG Schinnen are contracted to a custodial contractor who is responsible for purchasing the necessary cleaning agents, transports them onto the USAG for use and stores them at the USAG HQ Installation. Currently, the USAG has no control over what type of cleaning agents are being used and stored at the installation.

This P2 initiative provides the USAG to take control over the ordering, maintenance and storage of cleaning agents used at the Installation, by changing the current contractor or contract agreement, wherein cleaning agents used are bought, managed and stored internally by the USAG Schinnen. The USAG should approve the products used by custodial cleaners and enforce proper management and storage practices, as there are health and safety and liability implications in providing hazardous materials for contractors to use.

## **5.6.5 Control Pesticides Internally**

**Description:** Current pesticide control activities at the USAG Schinnen are part of the property rental contract with the property owner, who is responsible for providing the pest control contractor. The pest control contractor takes the responsibility for purchasing the necessary pesticides, transporting them onto the USAG for use and storing them at the USAG HQ Installation. Currently, the USAG has no control over what type of pesticides are being used and stored at the installation.

This P2 initiative provides the USAG to take control over the ordering, maintenance and storage of pesticides used at the Installation, by removing the pest control clause from the rental contract and obtaining a new pest control contract or contractor wherein pesticides used are bought, managed and stored internally by the USAG Schinnen. The USAG should approve the pesticides used by contractors and enforce proper management and storage practices, as there are health and safety and liability implications in providing hazardous materials for contractors to use.

## **5.6.6 Reduce Disposal Costs of Dry Chemical Extinguishers**

**Description:** Unserviceable fire extinguishers are the most costly hazardous waste disposed from the USAG Schinnen HQ Installation. Fire extinguisher disposal costs in FY 2004 totaled € 87,546.80 for 4,689 kg mass of extinguishers, which were disposed to an external contractor.

This P2 opportunity aims in reducing annual disposal costs of fire extinguishers by utilizing an external maintenance contractor to separate the hazardous dry chemical contents of the extinguishers from the extinguisher casings. The maintenance contractor would return both the contents and casings to USAG Schinnen at a cost price per extinguisher, which could be disposed separately through internal means. Current disposal methods for full dry chemical fire extinguishers result in a cost of approximately US\$ 19.29 per kg. The disposal of the separated dry chemical through USAG's internal hazardous waste program would result in a cost of US\$ 1.03 per kg for the dry chemical alone, while empty extinguisher cases could be turned in through the DOL at US\$ 0.10 per kg. Some extinguishers may also contain a carbon dioxide cartridge, which would also require separate disposal at a cost of US\$19.29 per kg.

### **Advantages:**

- Reduction in annual disposal costs of dry chemical fire extinguishers.

### **Disadvantages:**

- Additional on-site handling of hazardous waste such as the return of the removed dry chemical and carbon dioxide cartridges.

### **Environmental Benefit:**

- Potentially, reduce amount of hazardous waste.

### **Economic Feasibility/Cost Estimate:**

- Fire extinguishers may typically weigh from 5 to 16 kg. The following payback calculation assumes one dry chemical extinguisher weighs approximately 15 kg, in which the dry chemical contents weighs 7 kg, the extinguisher casing weighs 7 kg and the carbon dioxide cartridge weighs 1 kg.

- Based on information obtained from the USAG Schinnen EMO, the costs of services by the maintenance contractor are US\$ 9.28 per extinguisher.
- Hence the total cost for disposing an average 15 kg dry chemical fire extinguisher through this P2 option would cost US\$ 36.48 per extinguisher.
- The following payback calculation assumes the same number and weight of fire extinguishers are disposed yearly, which is estimated at 65 average extinguishers with a total weight of 975 kg (15 kg each).

**Table 10: Payback Calculation for Fire Extinguishers**

| Parameter  | Cost (US\$) |
|--|-------------|
| Capital/Start-up cost for P2 alternative   | 0.00        |
| Current estimated annual cost for disposal of 65 fire extinguishers totaling 975 kg            | 18,807.75   |
| Estimated annual cost for disposal of 65 fire extinguisher totaling 975 kg with P2 alternative | 2,371.20    |
| Annual savings after break even point  | 16,436.55   |
| Payback period   | Immediate   |

#### **5.6.7 Substitute Small Oil Containers with Larger Containers Equipped with POL Dispensing System**

**Description:** The use of small oil containers at the USAG Schinnen AAFES yielded approximately 2,000 kg of oil contaminated packaging waste in FY 2004, costing € 1,656 to dispose. If large quantities of POL are used, 55-gallon (approximately 200 L) drums are preferable to 5-gallon cans or other small containers that may unnecessarily increase the hazardous waste stream of oil contaminated packaging waste. This P2 opportunity suggests replacing current small oil containers at AAFES with larger containers, such as 55-gallon drums.

POL contaminated material, such as oily rags, absorbent material, etc., are generated through clean up of spill occurring during engine maintenance activities and oil changes. If the USAG implements larger oil containers or drums to substitute small oil containers at the USAG Schinnen AAFES, a bulk POL dispensing systems may be necessary to minimize potential spills and POL contaminated waste. The use of a bulk POL dispensing system can reduce spills from dispensing of liquids from 55-gallon drums.

There are different types of bulk POL dispensing systems available, depending on the contents of the drums, whether the system is stationary or mobile, and whether secondary containment is necessary.

#### **Advantages:**

- Potentially reduces the amount of hazardous waste generated from oil contaminated packaging material.
- The likelihood of POL spills is reduced, which in turn reduces the disposal of POL-contaminated solids and procurement of new absorbent materials.
- Larger oil containers require less space than many small containers on pallets.

**Disadvantages:**

- Only one type of motor oil is available.
- Potential for larger POL spills if POL dispensing system is not used properly.

**Environmental Benefits:**

- Potential reduction in hazardous waste stream of small oil contaminated packaging material.
- Reduce potential spills.
- Reduced use of resources (material use from smaller containers is greater than from larger containers).

**Economic Feasibility/Cost Estimate:**

- A bulk dispensing system, including secondary containment, costs between €150 and 2500, depending on the content of the drum and whether it is for stationary or mobile use.
- A payback period calculation is not possible because the costs depend on the type of bulk dispensing system needed at the AAFES. In addition, the potential reduction of spills cannot be quantified.

## CHAPTER 6 NON-HAZARDOUS SOLID WASTE

### 6.1 GOAL

Ensure that the non-hazardous solid waste generation per capita is continuously reduced and that the diversion of non-hazardous solid waste is continuously increased. According to USAG Schinnen's Solid Waste Annual Report for FY 2003 and their Solid Waste Management Plan, the USAG has already reached approximately 80% diversion of solid waste.

### 6.2 BASELINE AND PROGRESS

**Table 11: Baseline and Progress of Total Non-Hazardous Solid Waste Disposed**

| Non-Hazardous Solid Waste <sup>7</sup> |         |         |         |         |         |         | Target:<br>continuous<br>reduction<br>and<br>diversion |
|--|---------|---------|---------|---------|---------|---------|--|
| Baseline                               |         |         |         |         |         |         |  |
| Year                                   | FY 2001 | FY 2002 | FY 2003 | FY 2004 | FY 2005 | FY 2006 | FY 2007  |
| Generated (US tons)                    | 784.427 | 890.125 | 889.751 |         |         |         |  |
| Disposed (US tons)                     | 121.32  | 139.69  | 135.342 |         |         |         |  |
| Recycled (US tons)                     | 663.107 | 750.435 | 754.409 |         |         |         |  |
| Diversion (%)                          | 84.5    | 84.3    | 84.8    |         |         |         |  |

The total solid waste data may include solid waste from outside facilities such as the AMC. Part of the AMC closed operations in February 2004 and will close remaining operations and cease generating solid waste in August 2005. It is expected that the total recycling rate may decrease.

### 6.3 DESCRIPTION OF MAJOR SOLID WASTE STREAMS

The largest three amounts of solid waste generated at USAG Schinnen in FY 2003 were cardboard, wood and compost. The three most costly solid wastes in FY 2003 were white goods/appliances, sewage sludge and electronic equipment. According to the baseline inventory of December 2004, the following main solid waste streams at the USAG Schinnen are generated above 20 US tons (FY 2003 data) are:

- Cardboard;
- Wood;
- Compost;

<sup>7</sup> All Data From: Baseline Inventory, December 2004



- Lead-acid batteries<sup>8</sup>;
- Pallets;
- Timber/wood waste;
- Sewage sludge;
- Food waste/garbage;
- Mixed paper;
- Colored paper; and
- Metals.

The following waste streams generated at the USAG Schinnen result in disposal costs greater than US\$ 2,000:

- White goods/appliances;
- Sewage sludge;
- Electronics;
- Tires;
- Used motor oil<sup>9</sup>;
- Other (non-food) waste; and
- Lead-acid batteries.

## 6.4 PAST COMPLETED POLLUTION PREVENTION INITIATIVES

### 6.4.1 Office Paper Recycling

**Description:** The SORT Center formerly leased office paper recycling bins at a cost of US\$ 280 per month resulting in a total cost of US\$ 3,360 per year. In 2000 the USAG Schinnen implemented this P2 initiative by purchasing seven paper recycling bins at US\$ 500 each resulting in only US\$ 160 more than one year's leasing costs.

Funding for this P2 initiative was provided by VEPP.

**Environmental Benefit:** None noted.

**Economic Benefit:** This P2 initiative resulted in cost savings by purchasing USAG's own recycling bins rather than leasing them.

## 6.5 POTENTIAL POLLUTION PREVENTION INITIATIVES

### 6.5.1 Scrap Metal Recycling

**Description:** The baseline investigation revealed that approximately 22 US-tons of scrap metal was disposed and recycled in FY 2003. Currently, the USAG holds a contract with the waste disposal company SITA, which provides the scrap metal container, collects the container when full and removes it from the USAG. SITA then transports and distributes the scrap metal to their respective recycling companies. The USAG pays monthly costs for SITA's services, which include container rental costs, recycling costs, and an on-call pick-up service for 12 times per year.

---

<sup>8</sup> The lead-acid batteries listed within solid waste originated from household waste and therefore fall under non-hazardous solid waste at the USAG Schinnen.

<sup>9</sup> The used motor oil listed within solid waste originated from household waste and therefore falls under non-hazardous solid waste at the USAG Schinnen.

This P2 opportunity involves changing contractors and acquiring a new scrap metal disposal contract directly through a metal recycling company that will provide the container, retrieve the full container and recycle the scrap metal contents at no cost to the USAG.

**Advantages:**

- No disposal or contractual costs for scrap metal recycling.

**Disadvantages:**

- None noted.

**Environmental Benefit:**

- None noted.

**Economic Feasibility/Cost Estimate:**

- The following payback calculation assumes no additional capital or start-up costs required to change metal waste disposal contractors.

**Table 12: Payback Calculation for Scrap Metal Recycling**

| Parameter   | Cost (Euros) |
|---|--------------|
| Capital/Start-up cost for P2 alternative          | 0.00         |
| Current annual cost for SITA container rental     | 1,056.72     |
| Current annual cost for SITA's collection service | 240.00       |
| Operating cost with P2 alternative                | 0.00         |
| Annual savings after break even point             | 1,296.72     |
| Payback period                                    | Immediate    |

## **6.5.2 Construct Roof for Sand/Soil Storage Area**

**Description:** Sand and soil is stored at the USAG Schinnen HQ Installation beside the Buildings & Grounds (B&G) Department. The sand and soil is stored in an open area and exposed to the elements, resulting in excess sand runoff into the drains during rain. The sand/soil runoff is collected in the mud-traps and contributes to the disposal costs associated with clearing and removing waste from the mud-traps. In FY 2004 the USAG disposed 1,840 kg of solid waste from the mud-traps costing € 846.34.

This P2 opportunity involves the construction of a covering roof over the sand and soil storage area to minimize potential runoff into the drains and mud-traps when raining.

**Advantages:**

- Minimize mud-trap waste.
- Reduce mud-trap waste disposal costs.

**Disadvantages:**

- Capital costs to construct roof.

**Environmental Benefit:**

- Minimize mud-trap waste.

**Economic Feasibility/Cost Estimate:**

- The following payback calculation assumes that all mud-trap waste is a result of sand/soil runoff and that roof construction costs are approximately € 6,000 to 8,000, for a simple steel structure with a tin roof spanning an area of approximately 4 meter (m) by 4m and a maximum height of 3m. Annual maintenance costs for the P2 alternative may include tasks such as painting or gutter repair, etc.

**Table 13: Payback Calculation for Roof Construction**

| Parameter  | Cost (Euros) |
|--|--------------|
| Capital cost for roof construction including labor | 6,000.00     |
| Current annual cost for mud-trap waste disposal    | 846.34       |
| Annual maintenance cost with P2 alternative        | 40.00        |
| Annual savings after break even point              | 806.34       |
| Payback period                                     | 7.4 years    |

**6.5.3 Wood Crushing Machine**

**Description:** Wood waste, including scrap wooden pallets, generated at the USAG Schinnen in FY 2003 totals approximately 160 US-tons. Currently, wood waste is collected in containers, removed from the USAG by the waste disposal contractor and recycled off-site. This P2 opportunity aims at reducing the volume of wood waste with a crushing machine at the USAG Schinnen SORT Center, in turn reducing the required number of times per year for container collection by the contractor.

Two of the largest waste disposal companies in the Netherlands, SITA and AVR, were approached for further information and availability of wood crushing machinery. SITA do not provide such machinery, other than containers and disposal or recycling services off-site. AVR can provide wood crushing machinery that is built and tailored specifically to on-site operations; however this may be a costly option.

**Economic Feasibility:** The feasibility of implementing such a wood-crushing machine at the SORT Center is a P2 opportunity that can be evaluated in a follow-up P2 project.

## CHAPTER 7 WATER AND WASTEWATER

### 7.1 GOAL

The installation's goal is to show a continuous annual reduction in potable water consumption and in wastewater generation.

### 7.2 BASELINE AND PROGRESS

**Table 14: Baseline and Progress of Water Consumption**

| Water Consumption<br>(cubic meters [m <sup>3</sup> ] per year) |         |         |         |         |         |         | Target:<br>continuous<br>reduction |
|--|---------|---------|---------|---------|---------|---------|------------------------------------|
| Baseline   |         |         |         |         |         |         |                                    |
| FY 2003  | FY 2004 | FY 2005 | FY 2004 | FY 2005 | FY 2006 | FY 2007 | FY 2008                            |
| 92,649 <sup>10</sup>   |         |         |         |         |         |         |                                    |

Wastewater generated at the USAG Schinnen comprises of sanitary wastewater and storm water only. The USAG Schinnen HQ Installation has separate sewer systems for sanitary wastewater and storm water. The sanitary wastewater sewer system is connected to the municipal sewer system and storm water sewer lines discharge directly into an on-site pond and lake. No sewer system effluent data is currently taken or required. The amount of wastewater effluent of USAG Schinnen Installations is approximately equal to the amount of potable water used plus storm water discharge.

### 7.3 CURRENT POLLUTION PREVENTION INITIATIVES

#### 7.3.1 Water Management Measures

**Description:** Water management measures consist of implementing water efficient tools, such as low-flow toilets, faucet aerators and high efficiency shower heads. USAG Schinnen EMO confirmed that the Schinnen HQ Installation already utilizes low-flow toilets and that new buildings are already equipped with energy efficient faucets. In addition to already present water management measures, any remaining faucets, especially in the older buildings, should be continually upgraded with faucet aerators and all showers, such as those in the fitness center, should be fitted with high efficiency shower heads.

During housing turnover and change of residential occupants, such water management fittings should be evaluated and upgraded to high efficiency shower heads, aerated faucets and low-flow toilets, where necessary.

**Environmental Benefit:** This P2 initiative will increase water efficiency and may reduce overall water consumption.

<sup>10</sup> From: Baseline Inventory December 2004 and includes values for the USAG Schinnen HQ Installation, SSO Schinnen, Rotterdam Admin facility, HSG GLQ, HSG GRHP, TSC Treebeek and DoD School Volkel.

**Economic Benefit:** By increasing efficiency and reducing water consumption, overall water use costs may decrease.

### **7.3.2 Awareness Program**

**Description:** A P2 Awareness Training Program has been developed for the USAG Schinnen, described in Section 3.9 of this P2 Management Plan. P2 awareness training sessions will commence at the USAG Schinnen in 2005. By conducting P2 awareness training to USAG Schinnen staff and implementing a water efficiency campaign, the USAG can increase awareness among staff and residents. A water efficiency campaign could include the distribution of brochures and leaflets to all residential units in addition to the 'mock billing' system described in Section 7.4.2.

**Environmental Benefit:** This P2 initiative may increase efficient water use among staff and residents.

**Economic Benefit:** By increasing efficiency and reducing water consumption, overall water use costs may decrease.

## **7.4 POTENTIAL POLLUTION PREVENTION INITIATIVES**

### **7.4.1 Metering System**

**Description:** Although residential units are not individually metered internally, they are considered, by USAG staff, to be one of the greatest users of water. A P2 initiative identified for improving P2 awareness among residents is the random metering of residential water use. Water use meters at residential homes should be randomly selected and monitored for at least one month in order to identify the costs incurred by those individual residents. Upon obtaining this data, economic incentives can be applied, as discussed in Section 7.4.2.

In addition, there is unequal distribution of water consumption within the USAG Schinnen HQ Installation. A metering system for the HQ installation has recently been started in order to monitor which departments are the largest consumers. However, this may require additional labor hours of approximately 15 hours per month to read and record water meters, some of which are in poorly accessible areas, on a regular basis. Currently not every building is equipped with individual water meters and those present may be old or difficult to reach. Hence, meters should be upgraded, replaced or installed where necessary to increase metering efficiency.

Metering facilities such as commissaries, vehicle maintenance units, wash areas and office buildings would allow implementation of incentive programs based on water use goals, as described in Section 7.4.2. Meeting these conservation targets would be the responsibility of the facility managers and staff supervisors. With the availability of water use data and a specific reduction goal, managers can better educate and motivate staff to implement conservation policies already in place, or to discover new opportunities for improving conservation.

**Environmental Benefit:** This P2 initiative may increase efficient water use among staff and residents.

**Economic Benefit:** By increasing efficiency and reducing water consumption, overall water use costs may decrease.

#### 7.4.2 Economic Incentives

**Description:** The largest consumer of potable water is the Government Leased Quarters/Housing with a total water consumption of 77,493 m<sup>3</sup> in FY 2003 for all residential units of Housing (HSG) Government Leased Quarters (GLQ) and HSG Government Rental Housing Program (GRHP). The USAG Schinnen HQ Installation consumed 11,435 m<sup>3</sup> of potable water in FY 2003.

According to EMO staff, general conservation policies and education are provided to residents and new HQ staff, but conservation is not individually monitored or enforced. Because residents and individual departments within the USAG Schinnen HQ Installation are not billed for their water use, they generally are not aware of how high their water use is and there is little incentive for reducing water use.

Upon implementation of a central metering system at the HQ Installation and a random monitoring system at residential units, as described in Section 7.4.1, the monitored residences and/or facilities would receive a 'mock bill' to enhance economic incentives. The 'mock bill' would depict the amount of water they used and how much that water would cost if they had actually been billed for these services. This type of metering program has been implemented at Army installations in the United States and has been shown to substantially decrease the amount of residential water use. The 'mock bill' could include information on how to reduce water use in households. Monitoring of water use and issuing 'mock bills' at other types of facilities at the USAG would likely result in similar decrease in consumption. Meeting these conservation targets and accountability for the 'mock bills' would be the responsibility of the facility managers and staff supervisors.

**Environmental Benefit:** This P2 initiative may increase efficient water use among staff and residents.

**Economic Benefit:** By increasing efficiency and reducing water consumption, overall water use costs may decrease.

#### 7.4.3 Water Efficient Equipment

**Description:** The USAG Schinnen already implements regular inspection programs and contractor services for all water consuming equipment and plumbing. During such programs, the inspector should be aware to upgrade any equipment or plumbing requirements with the most water efficient options on the market when such equipment needs replacement. This behavior should apply to all maintenance tasks, including dishwashers and washing machines etc. The process of slowly upgrading equipment with better efficiency equipment, when necessary, can also be addressed during P2 awareness training programs.

**Environmental Benefit:** This P2 initiative will increase water efficiency and may reduce overall water consumption.

**Economic Benefit:** By increasing efficiency and reducing water consumption, overall water use costs may decrease.

## CHAPTER 8 ENERGY CONSERVATION

### 8.1 GOAL

Reduce facility energy consumption 30% per square foot by 2005 and 35% by 2010 from a 1985 baseline.

### 8.2 BASELINE AND PROGRESS

**Table 15: Baseline and Progress of Energy Consumption**

| Energy Consumption<br>(KWHr) |         |         |         |         |         | Target:<br>continuous<br>reduction |
|------------------------------|---------|---------|---------|---------|---------|------------------------------------|
| Baseline                     |         |         |         |         |         |                                    |
| FY 2003                      | FY 2004 | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009                            |
| 6,207,776 <sup>11</sup>      |         |         |         |         |         |                                    |

### 8.3 CURRENT POLLUTION PREVENTION INITIATIVES

#### 8.3.1 Awareness Program

**Description:** A P2 Awareness Training Program has been developed for the USAG Schinnen, described in Section 3.9 of this P2 Management Plan. P2 awareness training sessions will commence at the USAG Schinnen in 2005. By conducting P2 awareness training to USAG Schinnen staff and implementing an energy efficiency campaign, the USAG can increase awareness among staff and residents. An energy efficiency campaign could include the distribution of brochures and leaflets to all residential units in addition to the 'mock billing' system described in Section 8.4.3.

**Environmental Benefit:** This P2 initiative may increase efficient energy use among staff and residents.

**Economic Benefit:** By increasing efficiency and reducing energy use, overall energy costs may decrease.

### 8.4 POTENTIAL POLLUTION PREVENTION INITIATIVES

#### 8.4.1 Insulation of Exposed Heating Pipes

**Description:** The heating plant at the USAG Schinnen HQ Installation has un-insulated pipelines within the heating plant, which can result in loss of heat. Exposed pipelines outside the heating plant are minimal and double-walled. All other external pipelines are below ground.

<sup>11</sup> From: Baseline Inventory, December 2004 and includes values for the USAG Schinnen HQ Installation, SSO Schinnen, SSQ Hoensbroek, Rotterdam Admin Facility, HSG GLQ, HSG GRHP, TSC Treebeek and DoD School Volkel.

The exposed pipelines within the heating plant and their respective valves and pumps should be insulated to reduce loss of heat and energy. Insulation material can be procured on the local market, and is easily installed.

**Environmental Benefit:** This P2 initiative may increase energy efficiency.

**Economic Benefit:** By increasing efficiency and reducing energy use, overall energy costs may decrease.

#### **8.4.2 Metering System**

**Description:** Although residential units are not individually metered internally, they are considered, by USAG staff, to be one of the greatest users of utilities. A P2 opportunity identified for improving P2 awareness among residents is the random metering of residential utilities. Electricity and gas meters at residential homes should be randomly selected and monitored for at least one month in order to identify the costs incurred by those individual residents. Upon obtaining this data, economic incentives can be applied, as discussed in Section 8.4.3.

In addition, there is unequal distribution of energy consumption within the USAG Schinnen HQ Installation. A metering system for the HQ installation has recently been started in order to monitor which departments are the largest consumers. However, this may require additional labor hours of approximately 15 hours per month to read and record electricity meters, some of which are in poorly accessible areas, on a regular basis. Currently, there are only four city heat (gas) meters at the USAG Schinnen and not every building is equipped with electricity meters. Currently present meters may be old or difficult to reach. Hence, meters should be upgraded, replaced or installed where necessary to increase metering efficiency.

Metering facilities such as commissaries, vehicle maintenance units, storage areas and office buildings would allow implementation of incentive programs based on energy use goals, as described in Section 8.4.3. Meeting these conservation targets would be the responsibility of the facility managers and staff supervisors. With the availability of energy use data and a specific reduction goal, managers can better educate and motivate staff to implement conservation policies already in place, or to discover new opportunities for improving conservation.

**Environmental Benefit:** This P2 initiative may increase efficient energy use among staff and residents.

**Economic Benefit:** By increasing efficiency and reducing energy use, overall energy costs may decrease.

#### **8.4.3 Economic Incentives**

**Description:** The total energy consumption resulting from residential units (HSG GLQ and HSG GRHP) during FY 2003 was 2,176,733 kilowatt-hour (kWh), which was exceeded only by the USAG Schinnen HQ Installation, which consumed 2,625,083 kWh.

According to EMO staff, general conservation policies and education are provided to residents and new HQ staff, but conservation is not individually monitored or enforced. Because residents and individual departments within the USAG Schinnen HQ Installation



are not billed for their energy use, they generally are not aware of how high their energy consumption is and there is little incentive for reducing energy use.

Upon implementation of a central metering system at the HQ Installation and a random monitoring system at residential units, as described in Section 8.4.2, the monitored residences and/or facilities would receive a 'mock bill' to enhance economic incentives. The 'mock bill' would depict the amount of energy they used and how much that energy would cost if they had actually been billed for these services. This type of metering program has been implemented at Army installations in the United States and has been shown to substantially decrease the amount of residential energy use. The 'mock bill' could include information on how to reduce energy in households (see 8.3.1 Awareness Program). Monitoring of energy use and issuing 'mock bills' at other types of facilities at the USAG would likely result in similar decrease in consumption. Meeting these conservation targets and accountability for the 'mock bills' would be the responsibility of the facility managers and staff supervisors.

**Environmental Benefit:** This P2 initiative may increase efficient energy use among staff and residents.

**Economic Benefit:** By increasing efficiency and reducing energy use, overall energy costs may decrease.

#### **8.4.4 Installation of Photovoltaic Panels**

**Description:** This P2 opportunity involves the installation of solar electrical (photovoltaic) panels at selected USAG facilities to provide power to water heaters or to outdoor equipment. Photovoltaic panels can be procured on the local market, and are easily installed. Although photovoltaic panels are most easily integrated into the construction of new buildings, older or already present buildings could also be retrofitted, provided the roof is in adequate condition. Panels can also be installed on structural elements, such as barrier walls.

**Environmental Benefit:** The primary environmental benefit of the use of solar electricity is the reduction in greenhouse gases.

**Economic Benefit:** By increasing efficiency and reducing energy use, overall energy costs may decrease.

#### **8.4.5 Consolidate Printer Use and Minimize Personal Printers**

**Description:** Based on conversations with USAG personnel, current HQ Installation office buildings often use one printer per person or one printer per every two people. This P2 initiative consolidates printer use to one centralized location with fewer printers that can service from 6 up to 10 people per printer room. This P2 initiative reduces the number of electrical equipment within the office environment and the energy used as a result.

Considerations need to be made regarding available office space for these separate printer rooms, IT personnel and labor hours to install a new printing system and allowing appropriate and safe ventilation and air conditioning of the newly allocated printer rooms.

**Environmental Benefit:** This P2 initiative may increase efficient energy use among staff.

**Economic Benefit:** By increasing efficiency and reducing energy use, overall energy costs may decrease.

#### **8.4.6 Energy Efficient Equipment**

**Description:** The USAG Schinnen already implements regular inspection programs and contractor services for all electrical or energy consuming equipment. During such programs, the inspector should be aware to upgrade any electrical equipment with the most energy efficient options on the market when such equipment needs replacement. This behavior should apply to all maintenance tasks, including lighting fixtures, computer hardware such as monitors, refrigerants or air-conditioners etc. The process of slowly upgrading equipment with better efficiency equipment, when necessary, can also be addressed during P2 awareness training programs.

**Environmental Benefit:** This P2 initiative will increase energy efficiency.

**Economic Benefit:** By increasing efficiency and reducing energy use, overall energy costs may decrease.

## **CHAPTER 9**

### **AFFIRMATIVE PROCUREMENT**

#### **9.1 GOALS**

The main goals for affirmative procurement (AP) are to train procurement officers and integrate AP into developing plans, work statements, and USAG Schinnen specifications.

#### **9.2 CURRENT POLLUTION PREVENTION INITIATIVES**

##### **9.2.1 Awareness Program**

**Description:** A P2 Awareness Training Program has been developed for the USAG Schinnen, described in Section 3.9 of this P2 Management Plan. Potential AP measures and methods for integrating those measures can be introduced to USAG Schinnen personnel during the P2 awareness training sessions.

**Environmental Benefit:** This P2 initiative will increase utilities efficiency and environmental compliance.

**Economic Benefit:** By increasing efficiency and maintaining compliance, overall costs may decrease.

#### **9.3 POTENTIAL POLLUTION PREVENTION INITIATIVES**

##### **9.3.1 Energy Efficient Equipment**

**Description:** Refer to Sections 7.4.3 and 8.4.6 for detailed descriptions pertaining to this P2 initiative.

##### **9.3.2 Electric Vehicles**

**Description:** Non-tactical vehicles at the USAG Schinnen HQ Installation are predominantly gasoline and diesel fueled. One potential P2 opportunity to reduce fuel use and vehicle emissions to the atmosphere, are electric vehicles, which are operated and recharged through the electricity grid. USAG non-tactical service vehicles could be replaced on an as-needed basis with electric vehicles.

Prices of electric vehicles vary greatly depending on the specification, however smaller city electrical vehicles, such as the City-EI or the Twike model, may cost within the range of €10,000 to €20,000. Electric vehicles typically require approximately 10 to 12 hours overnight to charge the lead-acid batteries that fuel the vehicle with energy. The lead-acid batteries used in electric vehicles last approximately three years before needing replacement. The replacement cost of an entire pack of lead-acid batteries for one electric vehicle can cost approximately US\$ 1,000 to US\$ 1,200. Consideration must also be made regarding potential hazardous waste disposal or recycling costs associated with the batteries and their lifespan. Furthermore, electric vehicles require charging outlets that can be installed at a central charging location within the HQ Installation.

Due to the limited data, pertaining to details of all on-site vehicles, and the general ongoing nature of replacing fuel consuming vehicles when deemed necessary, fuel use reduction resulting from this P2 opportunity has not been quantified, nor have cost savings been calculated. The feasibility of implementing and phasing-in electric vehicles is a P2 opportunity that can be evaluated in a follow-up P2 project.

**Environmental Benefit:** The primary environmental benefit of this P2 initiative is the reduction in greenhouse gases, fuel use and vehicle emissions to the atmosphere.